

ABSTRACT OF THE DISCLOSURE

A method for manufacturing NMR measurement-while-drilling tool having the mechanical strength and measurement sensitivity to perform NMR measurements of an earth formation while drilling a borehole, and a method and apparatus for monitoring the motion of the measuring tool in order to take this motion into account when processing NMR signals from the borehole. The tool has a permanent magnet with a magnetic field direction substantially perpendicular to the axis of the borehole, a steel collar of a non-magnetic material surrounding the magnet, antenna positioned outside the collar, and a soft magnetic material positioned in a predetermined relationship with the collar and the magnet that helps to shape the magnetic field of the tool. Due to the non-magnetic collar, the tool can withstand the extreme conditions in the borehole environment while the borehole is being drilled. Motion management apparatus and method are employed to identify time periods when the NMR measurements can be taken without the accuracy of the measurement being affected by the motion of the tool or its spatial orientation.